

REMARKS

The Specification and Drawings have been amended for clarification purposes only, and thus, do not present new matter. Claims 1, 6, 7, 9 and 12 have been amended. Claim 14 has been canceled and claim 22 has been added. Thus, claims 1-13 and 15-22 are currently pending in the case. Further examination and reconsideration of the presently claimed application is hereby respectfully requested.

Section 112, 2nd Paragraph, Rejections:

Claim 6 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 has been amended to expedite prosecution. This amendment is believed to clarify the claim language in a manner that addresses the concerns expressed in the Office Action about claim 6. Accordingly, removal of the §112 rejections of claim 6 is respectfully requested.

Section 102 Rejections:

Claims 1-3 and 6-7 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,955,037 to Holst et al. (hereinafter "Holst"). The standard for "anticipation" is one of fairly strict identity. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP 2131. Holst does not disclose all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

Holst does not teach or suggest a gas scrubber including 1) a guide plate comprising a funnel-shaped guide arranged between a combustion chamber and a wetting chamber, and 2) an injection nozzle directly coupled to the guide plate and adapted to deliver a conditioned gas for minimizing the production and/or accumulation of a powder on a surface of the guide plate.

Amended independent claim 1 states in part:

A gas scrubber comprising ... a guide plate comprising a funnel-shaped guide arranged between the combustion chamber and the wetting chamber for directing a gas from the combustion chamber into the wetting chamber; and an injection nozzle directly coupled to the guide plate, wherein the injection nozzle is adapted to deliver a conditioned gas to a space proximate to the guide plate for minimizing the production and/or accumulation of a powder on a surface of the guide plate.

Amended independent claim 7 recites a similar limitation. Support for the amendments to claims 1 and 7 may be found in the Substitute Specification, for example, on page 9, lines 2-14, page 10, lines 5-11 and in FIGS. 1-3 of the Drawings.

In general, the presently claimed case provides a novel means for preventing and/or removing a powder formation at an interface between the combustion and wetting chambers of a gas scrubbing system. Such means may include at least one injection nozzle and a guide plate. In one embodiment, an injection nozzle may be installed on all four sides of the guide plate for injecting air or nitrogen across the guide plate. In one example, the injection nozzle may continuously supply air or nitrogen to the guide plate for preventing contact between the high temperature gas of the combustion chamber and the low temperature gas of the wetting chamber. In other words, the air or nitrogen from the injection nozzle may form a gaseous curtain between the relatively hot and cold gases, such that contact between the hot and cold gases (or the cooler surface of the guide plate) is substantially prevented. In another example, the injection nozzle may inject air or nitrogen across the guide plate to remove any powder that may have formed above, or on a surface of, the guide plate. In this manner, the presently claimed case provides a means for automatically preventing and/or removing powder formation at the interface between the two chambers without system interruption, thereby increasing the efficiency rate of the gas scrubbing system. (*See, e.g.*, Substitute Specification, page 9, lines 5-14).

On the other hand, Holst discloses "an effluent gas treatment system 600... utilizing a pre-treatment unit, an oxidation unit, and a scrubber, wherein the scrubber and oxidation unit are coupled via a quench chamber." (Holst, column 19, lines 31-35). If one were to consider the quench chamber of Holst to be a "wetting chamber", it may be reasonable to consider the teachings of Holst as providing disclosure for a "wetting chamber" placed below a "combustion chamber" (i.e., the oxidation unit). However, Holst fails to disclose the presently claimed means for preventing and/or removing a powder formation at an interface between the combustion and wetting chambers. In other words, Holst fails to disclose an injection nozzle directly coupled to a funnel-shaped guide plate, which is arranged in a transverse configuration between the combustion and wetting chambers, and adapted to deliver a conditioned gas for minimizing the production and/or accumulation of powder on a surface of the guide plate. Supporting evidence of the failure of Holst to teach or suggest the claimed limitation will be set forth in more detail below.

Statements in the Office Action suggest that the guide plate of the presently claimed case structurally reads upon the lower portion of conduit 684, as shown in FIGS. 10 and 13 of Holst. (*See, e.g.,* Office Action, page 3). The Applicant disagrees and wishes to point out that the lower portion of conduit 684 (otherwise referred to as lower annular section 1030) includes inner weir wall 1011, which "extends vertically upwardly as shown" in FIG. 13 of Holst (*See, Holst, column 25, lines 39-45*). In this manner, even if the lower portion of conduit 684 were considered a "guide plate" – which it is not – the so-called "guide plate" of Holst would not include a funnel-shaped guide arranged between the combustion chamber and the wetting chamber, as taught in the presently claimed case.

On the contrary, FIG. 1 of the presently claimed case clearly illustrates a funnel-shaped guide plate (61 and 61a), which is arranged between a combustion chamber (10) and a wetting chamber (30) for directing a gas therebetween.

Further statements in the Office Action suggest that the injection nozzle of the presently claimed case structurally reads upon gas inlet ports 1022 and 1050, as shown in FIG. 13 of Holst (*See, e.g.,* Office Action, page 3). However, FIG. 13 of Holst illustrates gas inlet ports 1022 and 1050 as coupled to upper annular section 1008, and more specifically, to solid outer wall 1009 of upper annular section 1008. In column 25, lines 34-36, Holst discloses, "[t]he upper annular section 1008 terminates at its lower end in a flange 1026 which is matably engageable with flange 1028 of the lower annular section 1030." Since the upper and lower annular sections 1008, 1030 are merely attached by flanges 1026, 1028 (rather than formed as a single component), and since lower annular section 1030 (of FIG. 13) may be considered to correspond to the lower portion of conduit 684 (of FIG. 10), gas inlet ports 1022 and 1050 are not directly coupled to the lower portion of conduit 684. Therefore, gas inlet ports 1022 and 1050 are not directly coupled to the so-called "guide plate" of Holst.

Holst discloses the use of another injection nozzle, which is directly coupled to the so-called "guide plate" of Holst. Such an injection nozzle, however, is not adapted to supply a conditioned gas, as provided in present claim 1. Instead, Holst discloses that the "outer wall 1012 of the lower annular section 1030 is provided with a water inlet port 1048" for supplying water to the weeping weir gas/liquid interface structure, which in turn, "supplies a falling film of water on [the] interior surfaces of conduit 684... to entrain particulates and prevent their accumulation and coalescence on the interior wall surfaces of conduit 684." (Holst, column 20, lines 50-55). Obviously, Holst chooses to deal with the problem of particulate accumulation by providing an injection nozzle (i.e., water inlet port 1048), which is adapted to supply

water – not a conditioned gas – to a weeping weir gas liquid interface structure. Consequently, Holst fails to teach or suggest an injection nozzle, as recited in present claim 1.

In addition, Holst cannot be modified to teach or suggest the presently claimed injection nozzle, since Holst fails to suggest any desirability for doing to. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP 2143.01. Accordingly, Holst provides no motivation to teach or suggest all limitations of present claim 1.

Holst does not teach or suggest a gas scrubber including a water jacket installed on a gas intake for cooling a gas to prevent the gas from flowing backward from the combustion chamber to the gas intake at a high temperature. Amended independent claim 7 recites in part:

A gas scrubber comprising: a combustion chamber for eliminating explosive and flammable elements contained in a gas delivered into the combustion chamber from a gas intake; a water jacket surrounding an outer surface of the gas intake and providing an annular space through which cooling liquid is routed for cooling the gas, thereby preventing the gas from flowing backward from the combustion chamber and into the gas intake at a high temperature...

Support for the amendment to claim 7 may be found in the Substitute Specification, for example, on page 4, lines 5-9, on page 7, line 22 to page 8, line 2, and in the Drawings in FIG. 3.

The presently claimed case discloses another problem common to conventional gas treatment systems; namely, the occurrence of sudden gas reactions within a combustion chamber of the system caused when temperature of the combustion chamber is not maintained at a fixed temperature. These sudden gas reactions usually cause rapid gas expansion, which may result in gas flowing backward from the combustion chamber into the gas intake at a high temperature. The heated backward-flowing gas may, in turn, cause serious damage to the gas intake and/or to the main manufacturing system upstream from the gas treatment system. As a preventative measure, the presently claimed case utilizes a water jacket, which is installed on the gas intake to cool the heated gas flowing backward into the main system, thereby preventing explosion and other dangerous results at the manufacturing system. The water jacket is described in the Substitute Specification as “configured adjacent [to] the gas intake wall with cooling water routed through it”, and illustrated in FIG. 3 as reference numeral 18.

Holst, on the other hand, does not teach or suggest the use of a water jacket surrounding an outer surface of the gas intake and providing an annular space through which cooling liquid is routed for cooling the gas, thereby preventing the gas from flowing backward from the combustion chamber and into the gas intake at a high temperature. Statements in the Office Action, however, suggest that Holst discloses "the interface structures may be gas/liquid interface structures (cooling jacket)... and therefore the use of cooling jackets to cool flowing fluids is well known in the art as evidenced by Holst" (Office Action, page 7). The Applicant disagrees for at least the reasons set forth in more detail below.

Although Holst additionally refers to the weeping weir gas/liquid interface structure as a liquid reservoir "jacket" structure, the weeping weir gas/liquid interface structure of Holst does not surround an outer surface of the gas intake (e.g., inlet section 1007 of FIG. 13 of Holst), and thus, cannot be considered a "covering that encloses an intermediate space through which a temperature-controlling fluid circulates" (Merriam-Webster's Dictionary, online edition). As such, the weeping weir gas/liquid interface structure of Holst not only fails to describe the presently claimed water jacket, but also fails to describe a "jacket" in the plain sense of the word. Therefore, Holst fails to teach or suggest all limitations of present claim 7.

In addition, the invention of Holst cannot be modified to include the presently claimed water jacket, since Holst fails to suggest the desirability for doing so. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP 2143.01.

For example, Holst specifically mentions that the gas intake (as well as, any other piping, conduits, flow passages or fluid-contacting structures in the treatment system) is preferably heat-traced "to suppress deleterious sublimation or condensation of gas stream components" in the gas intake (i.e., inlet structure 1060), or to otherwise improve the performance of the treatment system. (See, e.g., Holst, column 24, lines 53-65 and column 26, lines 4-10). In this manner, Holst clearly provides no desirability for applying a cooling water jacket to the gas intake or any other conduit in the gas treatment system of Holst. As such, Holst provides no motivation to teach or suggest all limitations of present claim 7.

For at least the reasons set forth above, Holst provides no motivation to teach or suggest all limitations of independent claims 1 and 7. Therefore, claims 1 and 7 are asserted to be patentably distinct over the teachings of Holst. Since claims 2-6 are dependent from claim 1, claims 2-6 are patentably

distinct over the cited art for at least the same reasons as claim 1. Accordingly, removal of the §102(e) rejections of claims 1-3 and 6-7 is respectfully requested.

Section 103 Rejections:

Claims 1-18 and 20-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Korean Patent Publication 97-9311 to Kim (hereinafter "Kim") in view of Holst. In addition, claim 19 was rejected under 35 U.S.C. §103(a) as being unpatentable over Kim and Holst, and in view of U.S. Patent No. 5,900,217 to Hartung, et al. (hereinafter "Hartung").

To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond*, 910 F. 2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). The cited art does not provide motivation to teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

None of the cited art provides motivation to teach or suggest a gas scrubber including 1) a guide plate comprising a funnel-shaped guide arranged between a combustion chamber and a wetting chamber, and 2) an injection nozzle directly coupled to the guide plate and adapted to deliver a conditioned gas for minimizing the production and/or accumulation of a powder on a surface of the guide plate. As noted above, amended independent claims 1 and 7 provide a novel means for preventing and/or removing a powder formation at an interface between the combustion and wetting chambers of a gas scrubbing system. Such means include at least one injection nozzle, which is directly coupled to a (funnel-shaped) guide plate for delivering a conditioned gas to a space proximate to the guide plate.

Kim does not teach or suggest a gas scrubber including an injection nozzle directly coupled to a guide plate and adapted to deliver a conditioned gas for minimizing the production and/or accumulation of a powder on a surface of the guide plate. In fact, the Office Action admittedly states, "Kim fails to disclose the injection nozzle." (Office Action, page 5). Consequently, Kim fails to teach or suggest all limitations of present claims 1 and 7.

In addition, the invention of Kim cannot be modified to include the presently claimed injection nozzle, since Kim fails to suggest the desirability of making such a modification. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990); MPEP 2143.01.

As noted in various Responses to previous Office Actions, Kim fails to mention the manner in which the gas scrubber can be cleaned, i.e., how the powder can be removed from the area where the gas flowing out from the gas chamber makes contact with water. Therefore, Kim provides no motivation to teach or suggest the use of an injection nozzle, which as recited in present claims 1 and 7, is adapted to clean portions of the gas scrubber by delivering a conditioned gas for minimizing the production and/or accumulation of a powder on a surface of the guide plate. Consequently, Kim provides no motivation to teach or suggest all limitations of present claims 1 and 7.

However, statements in the Office Action suggest that Holst "shows the conventionality of providing ... gas/gas interface structures comprising an injection nozzle having an opening 1022, 1050 adapted to deliver a conditioned gas to a space proximate to the guide plate..." (Office Action, page 5). As noted in the above section 102 arguments, injection nozzles 1022 and 1050 of Holst are not directly coupled to a guide plate (much less a funnel-shaped guide plate) arranged between a combustion chamber and a wetting chamber. Reference should be made to the arguments presented above for further evidence supporting Holst's lack of motivation to teach or suggest the guide plate and injection nozzle structures of the presently claimed case.

Since none of the cited art teaches, suggests, or provides motivation for the aforementioned limitation, the cited art cannot be combined to teach or suggest such a limitation. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed.Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); MPEP 2143.01.

None of the cited art provides motivation to teach or suggest a gas scrubber including a water jacket installed on a gas intake for cooling a gas to prevent the gas from flowing backward from the combustion chamber to the gas intake at a high temperature. As noted above, amended independent claim 7 overcomes a problem common to conventional gas treatment systems by installing a

water jacket on the gas intakes of the treatment system. In the presently claimed case, the cooling water jacket encircles an outer surface of the gas intake to cool the gas, which may sometimes flow backward into the gas intake. In this manner, use of the water jacket may prevent the gas from flowing backward at a high temperature and damaging the gas intake or upstream manufacturing system.

For at least the reasons presented above in the section 102 arguments, Holst fails to provide motivation for a water jacket, as recited in present claim 7.

Furthermore, Kim fails to provide motivation for the presently claimed water jacket, and thus, cannot be combined with Holst to overcome the deficiencies therein. In fact, the presently claimed case explicitly identifies Kim's lack of prevention against backward flowing gas as a further disadvantage of the invention of Kim (note: Korean Patent No. 97-009311 to Kim and the presently claimed case share a common inventor). *See, e.g.,* Substitute Specification, page 3, line 21 to page 4, line 9. As such, Kim provides no motivation to teach or suggest a water jacket, as recited in present claim 7.

For at least the reasons set forth above, none of the cited art, either individually or in combination, provides motivation to teach or suggest all limitations of independent claims 1 and 7. Therefore, independent claims 1 and 7 are patentably distinct over the cited art. Since claims 2-6 are dependent from claim 1, claims 2-6 are patentably distinct over the cited art for at least the same reasons as claim 1. In addition, since claims 8-13 and 15-22 are dependent from claim 7, claims 8-13 and 15-22 are patentably distinct over the cited art for at least the same reasons as claim 7. Claim 14 has been canceled, thus obviating the rejection of that claim. Accordingly, removal of the §103 (a) rejection of claims 1-21 is respectfully requested.

Patentability of Added Claims:

The present Amendment adds dependent claim 22. Claim 22 is dependent on independent claim 7, and therefore, is patentably distinct over the cited art for at least the same reasons as noted above for the patentability of claim 7. Accordingly, approval of added claim 22 is respectfully requested.

CONCLUSION

This response constitutes a complete response to all issues raised in the Office Action mailed May 19, 2003. In view of the remarks traversing rejections, Applicants assert that pending claims 1-13 and 15-22 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned attorney earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment, to Conley Rose, P.C. Deposit Account No. 03-2769/5480-00201.

Respectfully submitted,



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